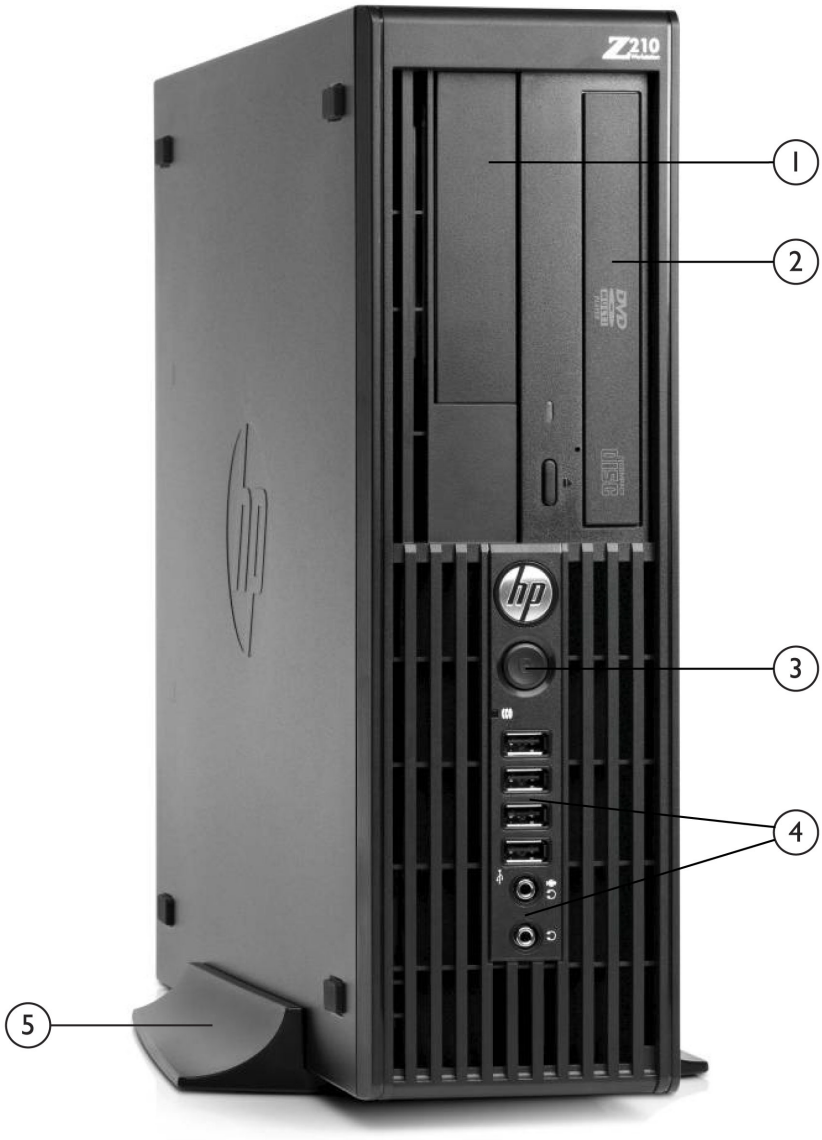
Overview



1. External 3.5" Bay
2. External 5.25" Bay
3. Power button
4. Standard Front I/O: 4 USB 2.0, headphone, microphone
5. Tower stand (optional)

Form Factor	Small Form Factor
Operating Systems	Genuine Windows® 7 Ultimate 64-bit Genuine Windows® 7 Professional 32-Bit Genuine Windows® 7 Professional 64-Bit

	NOTES: Systems may require upgraded and/or separately purchased hardware and/or DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details. HP Linux Installer Kit for Linux [includes drivers for 32-bit & 64-bit OS versions of Red Hat Enterprise Linux (RHEL) 5 Workstation, Red Hat Enterprise Linux (RHEL) 6 Workstation, 64-bit Novell SUSE Linux Enterprise Desktop (SLED) 11] See http://www.hp.com/workstations/software/linux for details. Novell SLED 11 Linux Preloaded Red Hat Enterprise Linux WS5 (Paper Licence drop-in-the-box only) For detailed OS/hardware support information for Linux, see: http://www.hp.com/support/linux_hardware_matrix Windows® XP 32-bit/ 64-bit OS and drivers supported; not available pre-installed
Available Processors	Intel® Xeon® processor E3-1280, 3.50 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel® vPro Technology Intel® Xeon® processor E3-1270, 3.40 GHz, 80W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel® vPro Technology Intel® Xeon® processor E3-1245, 3.30 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Intel® HD Graphics P3000, featuring Intel® vPro Technology Intel® Xeon® processor E3-1240, 3.30 GHz, 80W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel® vPro Technology Intel® Xeon® processor E3-1230, 3.20 GHz, 80W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel® vPro Technology Intel® Xeon® processor E3-1225, 3.10 GHz, 95W, 6 MB cache, 1333 MHz memory, Quad-Core, no HT, Intel® HD Graphics P3000, featuring Intel® vPro Technology Intel® Core i7-2600 processor, 3.40 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Intel® HD Graphics 2000, featuring Intel® vPro Technology Intel® Core i5-2500 processor, 3.30 GHz, 95W, 6 MB cache, 1333 MHz memory, Quad-Core, no HT, Intel® HD Graphics 2000, featuring Intel® vPro Technology Intel® Core i5-2400 processor, 3.10 GHz, 95W, 6 MB cache, 1333 MHz memory, Quad-Core, no HT, Intel® HD Graphics 2000,featuring Intel® vPro Technology Intel® Core i3-2120 processor, 3.30 GHz, 65W, 3 MB cache, 1333 MHz memory, Dual-Core, HT, Intel® HD Graphics 2000 Intel® Core i3-2100 processor, 3.10 GHz, 65W, 3 MB cache, 1333 MHz memory, Dual-Core, HT, Intel® HD Graphics 2000 Intel Pentium processor G850, 2.9 GHz, 65W, 3MB cache, 1333 MHz memory, Dual-Core, Intel HD Graphics 2000 Intel Pentium processor G620, 2.6 GHz, 65W, 3MB cache, 1066 MHz memory, Dual-Core, Intel HD Graphics 2000
Available Processor Disclaimers	Integrated Intel® HD graphics is not supported on the Intel® Xeon E3-1230, E3-1240, E3-1270 or E3-1280 Processors. Intel® Xeon E3, Intel Core i3 and Intel Pentium processors can support either ECC or non-ECC memory; Intel® Core i5/i7 processors only support non-ECC memory. Intel's numbering is not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: http://www.intel.com/products/processor_number/ for details. 64-bit computing on Intel® 64 architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers and applications enabled for Intel 64 architecture. Processor will not

	operate (including 32-bit operation) without an Intel 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. See: http://www.intel.com/info/em64t for more information. Dual-Core and Quad-Core technologies are designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefits; check with software provider to determine suitability; Not all customers or software applications will necessarily benefit from use of these technologies.	
Color	Jack Black	
Convertibility	The Z210 SFF can either be placed flat on the desktop or made to stand on the desk with the optional tower stand.	
Expansion Slots (see system board section for more details)	• 1 PCI Express Gen2 slot x1 mechanical/x1 electrical (Low Profile) • 1 PCI Express Gen2 slot x16 mechanical/ x16 electrical (Low Profile, dedicated for graphics) • 1 PCI Express Gen2 slot x16 mechanical/x4 electrical (Low Profile) • 1 PCI slot (Low Profile)	
Expansion Bays (see storage section for more details)	• 1 internal 3.5" bay, and 1 shared internal/external 3.5" bay. • 1 external 5.25" bay.	
Front I/O	4 USB 2.0, 1 Headphone, and 1 Microphone; Microphone can be re-tasked to function as Line-in or Headphone.	
Internal I/O	4 USB 2.0 ports available by two separate 9-pin headers	
Rear I/O	1 VGA and 1 DisplayPort output from Intel HD graphics (available on specific processors only); 6 USB 2.0, 1 standard and 1 optional serial port, 1 optional parallel port, 2 PS/2, RJ-45 (NIC), 1 Audio Line-in, and 1 Audio Line-out; Line-in can be re-tasked to function as Microphone.	
Interfaces Supported	22-in-1 Media Card Reader (optional)	
Chassis Dimensions (H x W x D)	Standard desktop orientation: 100 x 338 x 381 mm (3.95 x 13.3 x 15.0 in); Optional SFF Tower orientation (excluding stand dimension): 338 x 100 x 381 mm (13.3 x 3.95 x 15.0 in)	
Weight	Exact weights depend upon configuration; System Weight* 7.6 kg (16.72 lbs) Shipping Weight* 8.1 kg (17.86 lbs) Max Supported Weight (desktop orientation) 35 kg (77 lb) *Configured with 1 hard drive, 1 optical drive and one NVIDIA Quadro NVS 295 low profile graphics card.	
Temperature	Operating:	40° to 95°F (5° to 35°C)
	Non-operating:	-40° to 140°F (-40° to 60°C)
Humidity	Operating:	8% to 85%
	Non-operating:	8% to 90%
Maximum Altitude (non-pressurized)	Operating:	3,000 m (10,000 ft)
	Non-operating:	9,100 m (30,000 ft).
Power Supply	240 watts wide-ranging, active Power Factor Correction, 90% Efficient The Power Supply Efficiency Report for this product may be found at these links:	
Backup Devices	For a complete listing of compatible DAT tape drives, LTO tape drives and RDX Removable Disk Backup System offerings, please visit: http://www.hp.com/go/connect	
Chipset	Intel® C206 chipset	
Memory	4 DIMM slots, supporting up to 32GB** ECC/16GB non-ECC, DDR3 1333 MHz (** when 8GB DIMMs are available, estimated Q4 2011)	

Supported Components

Processors	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Intel® Xeon® processor E3 family (Z210)				
Intel Xeon processor E3-1280, 3.50 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel vPro Technology	Y	N		Supported with either ECC or non-ECC memory
Intel Xeon processor E3-1270, 3.40 GHz, 80W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel vPro Technology	Y	N		Supported with either ECC or non-ECC memory
Intel Xeon processor E3-1245, 3.30 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, HD Graphics P3000, featuring Intel vPro Technology	Y	N		Supported with either ECC or non-ECC memory
Intel Xeon processor E3-1240, 3.30 GHz, 80W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel vPro Technology	Y	N		Supported with either ECC or non-ECC memory
Intel Xeon processor E3-1230, 3.20 GHz, 80W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel vPro Technology	Y	N		Supported with either ECC or non-ECC memory
Intel Xeon processor E3-1225, 3.10 GHz, 95W, 6 MB cache, 1333 MHz memory, Quad-Core, no HT, HD Graphics P3000, featuring Intel vPro Technology	Y	N		Supported with either ECC or non-ECC memory
2nd generation Intel® Core™ processor family				
Intel Core i7-2600 processor, 3.40 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Intel HD Graphics 2000, featuring Intel vPro Technology	Y	N		Supported only with non-ECC memory
Intel Core i5-2500 processor, 3.30 GHz, 95W, 6 MB cache, 1333 MHz memory, Quad-Core, no HT, Intel HD Graphics 2000, featuring Intel vPro Technology	Y	N		Supported only with non-ECC memory
Intel Core i5-2400 processor, 3.10 GHz, 95W, 6 MB cache, 1333 MHz memory, Quad-Core, no HT, Intel HD Graphics 2000, featuring Intel vPro Technology	Y	N		Supported only with non-ECC memory

Supported Components

Intel Core i3-2120 processor, 3.30 GHz, 65W, 3 MB cache, 1333 MHz memory, Dual-Core, HT, Intel HD Graphics 2000	Y	N	Supported with either ECC or non-ECC memory
Intel Core i3-2100 processor, 3.10 GHz, 65W, 3 MB cache, 1333 MHz memory, Dual-Core, HT, Intel HD Graphics 2000	Y	N	Supported with either ECC or non-ECC memory
Dual-Core Intel Pentium processors (Z210)			
Intel Pentium processor G850, 2.9 GHz, 65W, 3MB cache, 1333 MHz memory, Dual-Core, Intel HD Graphics 2000	Y	N	Supported with either ECC or non-ECC memory
Intel Pentium processor G620, 2.6 GHz, 65W, 3MB cache, 1066 MHz memory, Dual-Core, Intel HD Graphics 2000	Y	N	Supported with either ECC or non-ECC memory

Intel HD Graphics P3000 provides improved desktop performance and supports workstation-specific graphics drivers for improved compatibility and performance on select professional applications*, compared to Intel HD Graphics 2000.

Hard Drives

SATA Hard Drives		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	SATA (Serial ATA) Hard Drives for HP Workstations				
	250GB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ034AA	
	500GB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ036AA	
	1TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ037AA	
	160GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	EW222AA	
	300GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	FM802AA	
	600GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	XP309AA	
SATA Solid State Drives	**HP Solid State Drive for Workstations**				
	HP 160GB SATA X25-M SSD	Y	Y	WV915AA	

Supported Components

Hard Drive Controllers	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated SATA Controller (Z210)				
Integrated SATA Controller (SFF), RAID 0,1 supported: 2 ports 3 Gb/s, 2 ports 6 Gb/s	Y	N		
Factory integrated RAID on motherboard for SATA drives				
RAID 0 Configuration - Striped Array	Y	N		
RAID 1 Configuration - Mirrored Array	Y	N		

SATA hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit: http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf for RAID capabilities with Linux.
All drives must be identical in type and capacity
All RAID arrays must be less than 2 TB
NOTE 1: Requires identical hard drives (speeds, capacity, interface).

Graphics

Integrated Graphics	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported Multi Mixed
Integrated Intel HD Graphics Media Accelerators (Z210)					
Intel HD Graphics 2000	Y	N		Available on Intel Core i3/i5/i7 processors only	1
Intel HD Graphics P3000	Y	N		Available on Intel Xeon E3-12x5 processors only	1
Professional 2D					
NVIDIA Quadro NVS 295 256MB PCIe Graphics Card	Y	Y	FY943AA		2
NVIDIA NVS300 512MB PCIe Graphics Card	Y	Y	XP612AA		2
AMD FirePro 2270 512MB Graphics Card	Y	Y	LA524AA		2
Entry 3D					
ATI FirePro V3800 512MB PCIe Graphics Card	Y	Y	WL048AA		1
NVIDIA Quadro 400 512MB Graphics Card	Y	Y	LD542AA		1
NVIDIA Quadro 600 1GB Graphics Card	Y	Y	WS093AA		1

Intermixing integrated Intel HD graphics and discrete graphics cards in order to drive more than two displays can be enabled using the Computer (F10) Setup Utility. However, HP recommends using only discrete graphics cards when attaching three or more displays.

Memory

Sub-Section Description/Notes

Intel® Xeon E3, Intel Core i3 and Intel Pentium processors can support either ECC or non-ECC memory; Intel® Core i5/i7 processors only support non-ECC memory.

CTO	Option Kit Part Number	Support Notes
PC3-10600 DDR3-1333 ECC Unbuffered DIMMs CTO		
2GB (2x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
3GB (3x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
4GB (2x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
8GB (4x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
8GB (2x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
16GB (4x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
PC3-10600 DDR3-1333 nECC Unbuffered DIMMs CTO		
1 GB (1x1GB) DDR3-1333 nECC Unbuffered RAM 1-CPU		
2 GB (2x1GB) DDR3-1333 nECC Unbuffered RAM 1-CPU		
4 GB (2x2GB) DDR3-1333 nECC Unbuffered RAM 1-CPU		
8 GB (4x2GB) DDR3-1333 nECC Unbuffered RAM 1-CPU		
8 GB (2x4GB) DDR3-1333 nECC Unbuffered RAM 1-CPU		
16 GB (4x4GB) DDR3-1333 nECC Unbuffered RAM 1-CPU		

Sub-Section Description/Notes

Two channels of DDR3 memory are supported. To realize full performance at least one DIMM must be inserted into each channel.

The CPUs determine the speed at which the memory is clocked. If a 1066 MHz capable CPU is used in the system, the maximum speed the memory will run at is 1066 MHz regardless of the specified speed of the memory.

AMO		
PC3-10600 DDR3-1333 ECC Unbuffered DIMMs AMO		
HP Z210 1GB (1x1GB) DDR3-1333 ECC Unbuffered RAM	QC851AA	
HP Z210 2GB (1x2GB) DDR3-1333 ECC Unbuffered RAM	QC447AA	
HP Z210 4GB (1x4GB) DDR3-1333 ECC Unbuffered RAM	QC852AA	
PC3-10600 DDR3-1333 nECC Unbuffered DIMMs AMO		
HP 1GB DDR3-1333 non-ECC UDIMM	XC497AA	
HP 2GB DDR3-1333 non-ECC UDIMM	XC440AA	
HP 4GB DDR3-1333 non-ECC UDIMM	LB435AA	

NOTE: Only unbuffered DDR3 DIMMs are supported.

Supported Components

Multimedia and Audio Devices	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Intel/Realtek HD ALC261 Audio	Y	N		
HP Thin USB Powered Speakers, BFR-PVC free	Y	Y	KK912AA	

Optical and Removable Storage	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP 16X DVD-ROM SATA Drive	Y	Y	EW268AA	See note 1
HP 16X DVD+/-RW SuperMulti SATA Drive	Y	Y	EW269AA	
HP 22-in-1 Media Card Reader Kit (Workstations)	Y	Y	NK361AA	
HP Blu-ray Writer	Y	Y	AR482AA	

Actual speeds may vary. Does not permit copying of commercially available DVD movies or other copyright protected materials. Intended for creation and storage of your original material and other lawful uses. Double Layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players. As Blu-ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.

Controller Cards	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP FireWire IEEE 1394a PCIe x1 Card	Y	Y	BW851AA	This card is only supported on Slots 1 or 2

For the Z210 SFF Workstation, this card is only supported on Slots 1 or 2

Supported Components

Monitors	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP ZR24w 24-inch S-IPS LCD Monitor	N	Y	VM633A8	
HP ZR22w 21.5-inch S-IPS LCD Monitor	N	Y	VM626A8	
HP LP3065 30-inch Widescreen LCD Monitor	N	Y	EZ320A	
HP LP2475w 24-inch Widescreen LCD Monitor	N	Y	KD911A	
HP LP2275w 22-inch Widescreen LCD Monitor	N	Y	KE289A	
HP DreamColor LP2480zx Professional Display	N	Y	GV546A	
HP LP2065 20-inch LCD Monitor	N	Y	EF227A	

Supported by all Operating Systems available from HP

Screen Size Diagonally Measured

Networking and Communications	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Intel 82579LM PCIe GbE Controller	Y	N		
Intel Gigabit CT Desktop NIC	Y	Y		

NOTE 1: "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

The Intel Gigabit CT NIC is supported on the following operating systems:
Microsoft Windows XP Pro 32-bit and 64-bit and Microsoft Windows 7 32-bit and 64-bit versions.
Red Hat Enterprise Linux(RHEL), 5 Desktop/Workstation
Novell SLED 10 & 11

NOTE 2: The integrated network connection is required to support Intel vPro Technology.

NOTE 3: If AMT is enabled network teaming with the built in LAN port is not possible.

Racking and Physical Security	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Security Cable with Kensington Lock	N	Y	PC766A	
HP 2009 (SFF) Solenoid Lock and Hood Sensor	Y	Y		
HP Business PC Security Lock Kit	N	Y	PV606AA	

Supported Components

Input Devices	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP USB Standard Keyboard	Y	Y	DT528A	
HP PS/2 Standard Keyboard	Y	Y	DT527A	
HP USB Smart Card Keyboard	N	Y	ED707AA	
HP USB CCID SmartCard Keyboard	Y	Y	BV813AA	
HP 2.4GHz Wireless Keyboard & Mouse	N	Y	NB896AA	
HP USB Laser Mouse	Y	Y	GW405AA	
HP USB 2-Button Optical Scroll Mouse	Y	Y	DC172B	
HP PS/2 Optical Scroll Mouse	Y	Y	EY703AA	
HP USB Optical 3-Button Mouse	Y	Y	DY651A	
HP SpaceExplorer 3D USB Controller	N	Y	RY429AA	

Other Hardware	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Power Cord Kit	N	Y	DM293A	
HP Workstation Mouse Pad	Y	N		Japan only
HP Serial Port Adapter	Y	Y	PA716A	
HP ENERGY STAR 5.0 Enabled Configuration	Y	N		
HP Parallel Port Adapter Kit	N	Y	KD061AA	
HP Internal USB Port Kit	N	Y		
HP eSATA PCI Cable Kit	Y	Y	FH966AA	

Software	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Performance Advisor	Y	N		Supports Windows 7 only. Available as a web download, or preloaded with all Windows 7 preinstalls.
Roxio Easy Media Creator (DVD/Blu-ray Disc burner software)	Y	N		
Intervideo WinDVD (DVD player/burner software)	Y	N		

Supported Components

HP ProtectTools Security	Y	N	Available June 2011. Must be selected as a Configure to Order option. Delivered in the form of a "Drop in the Box" CD.
PDF Complete - Trial Edition	Y	N	
HP Client Manager Software v6.2 (optional download)	Y	N	
HP Support Assistant	Y	N	
MS Office Home & Business 2010	Y	N	

Operating Systems	Support Notes
Genuine Windows® 7 Ultimate 64-bit	
Genuine Windows® 7 Professional 32-bit	See http://www.microsoft.com/windows/windows-7/ for support details.
Genuine Windows® 7 Professional 64-bit	See http://www.microsoft.com/windows/windows-7/ for support details.
HP Linux Installer Kit	See: http://www.hp.com/workstations/software/linux
Red Hat Enterprise Linux (RHEL) Workstation - Paper License (1yr)	See http://www.redhat.com/rhel/desktop/
Novell SLED 11 Linux	Preload; http:/www.novell.com/products/desktop

Windows XP 32-bit /64-bit OS and driver support available.

System Board		
System Board Form Factor	BTX 21.2mm x 26.7mm	
Processor Socket	Single LGA 1155	
CPU Bus Speed	DMI	
Chipset	Intel® PCH C206	
Memory Expansion Slots	4 DDR3 memory slots	
Memory Type Supported	DDR3, UDIMM (Unbuffered), ECC & non-ECC	
Memory Modes	Non-Interleaved for single channel. Interleaved when both channels are populated.	
Memory Speed Supported	1333MHz DDR3	
Memory Protection	ECC available on data, parity on address and command	
Memory		
Maximum Memory	16GB	

MEMORY LOADING CONFIGURATIONS

Memory Size (GB)	DIMM1	DIMM2	DIMM3	DIMM4
1	1 GB			
2	1 GB		1 GB	
3	1 GB	1 GB	1 GB	
4	2 GB		2 GB	
8	2 GB	2 GB	2 GB	2 GB
8	4 GB		4 GB	
16	4 GB	4 GB	4 GB	4 GB

Memory Configuration (Supported)	1GB, 2GB and 4GB ECC and non-ECC unbuffered DIMMs are supported, but not if mixed.	
PCI Express Connectors	1 PCI Express Gen2 x16 LP slot (x16 electrical/x16 mechanical) 1 PCI Express Gen2 x16 LP slot (x4 electrical/x16 mechanical) 1 PCI Express Gen2 x1 LP slot (x1 electrical/x1 mechanical) NOTE: LP = low profile NOTES: In the PCIe x16 (x16 electrical/x16 mechanical) Gen 2 slot, if it is not being used for a graphics card, only cards certified as After Market Options for this platform are supported.	
PCI Connectors (5.0V)	1 PCI LP slot	
Supported Drive Interfaces	SATA	Integrated (4) Serial ATA interfaces (2x 6Gb/s SATA in blue, 2x 3Gb/s SATA in black). One port can optionally be used for eSATA. NOTE: the Z210 SFF supports a maximum of two SATA/SSD drives only. RAID 0 and 1 supported. (Factory integrated RAID is Microsoft Windows only).
Serial Attached SCSI	None	

System Technical Specifications

Integrated RAID	NOTE: Requires identical hard drives (speeds, capacity, interface)	
Integrated Graphics	Integrated Intel HD Graphics 2000 (on Intel Core i3/Core i5/Core i7 processors). Integrated Intel HD Graphics P3000 (on Intel Xeon E3-12x5 processors). Unified Memory Architecture (UMA)- A region of system memory is reserved and dedicated to the graphics display. DirectX 10.0 compliant; (OpenGL 3.0 on Intel HD Graphics P3000); 1 VGA & 1 DP graphics ports integrated in motherboard. Integrated graphics can support dual display across DP & VGA outputs.	
Network Controller	Integrated Gbit LAN MAC by Intel PHY Lewisville 82579LM; Management capabilities WOL, PXE 2.1 and AMT 7	
External SATA (eSATA)	1 port eSATA capable with optional eSATA After-Market Option cable kit.	
IDE connector	No	
Floppy connector	No	
Network Controller	Management capabilities WOL, PXE 2.1 and AMT 7	
Serial	1 rear port	
2nd Serial	Yes- requires optional Serial Port Adapter Kit	
Parallel	1 internal header (optional parallel port adapter required)	
HD Integrated Audio	Yes	
CD-ROM input (Audio)	No	
AUX input (Audio)	No	
IEEE 1394 Connector(s)	Front	No
	Rear	2 IEEE 1394a (requires optional PCIe card)
	Internal	No
USB Connector(s)	Front	4 USB 2.0
	Rear	6 USB 2.0
	Internal	4 USB 2.0
HD Integrated Audio	Yes	
Flash ROM	Yes	
CPU Fan Header	Not applicable - passive CPU heatsink	
Chassis Fan Header	Yes	
Front PCI Fan Header	Yes	
Front Control Panel/Speaker Header	Yes	
CMOS Battery Holder - Lithium	Yes	
Integrated Trusted Platform Module	Integrated TPM 1.2. The TPM module disabled where restricted by law, i.e. Russia.	
Power Supply Headers	Yes	
Power Switch, Power LED & Hard Drive LED Header	Yes	
Clear Password Jumper	Yes	
Keyboard/Mouse	USB or PS/2	
Power Supply	240W, 90% efficiency	
Operating Voltage Range	90-264 VAC	

System Technical Specifications

Rated Voltage Range	100-240 VAC
Rated Line Frequency	50/60 Hz
Operating Line Frequency Range	47-63 Hz
Rated Input Current	4A @ 100-127V 2A @ 200-240V
Heat Dissipation	Typical 541 btu/hr (136.3 kg-cal/hr) Maximum 1098 btu/hr (276.6 kg-cal/ hr)
Power Supply Fan	92x25 mm variable speed
ENERGY STAR® qualified (Config Dependent)	Yes
80 PLUS Compliant	Yes, Gold.
FEMP Standby Power Compliant	Yes, with Wake-on-LAN disabled: <2W in S5- Power Off
Power consumption in sleep mode (as defined by ENERGY STAR) - Suspend to RAM (S3)	<4W
Built-in Self Test (BIST) LED	No
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	Yes
ErP Lot 6- Tier 1 Compliance @ 230V (<1W in S5- Power Off)	Yes
ErP Lot 6- Tier 2 Compliance @ 230V (<0.5W in S5- Power Off)	Yes

Energy Consumption and Heat Dissipation: Configurations

System Configuration

Example Configuration #1

Processor Info	1x Intel Core i3-2120 3.3 3MB 2C 65W GT1 CPU
Memory Info	1GB (1x 1GB) 1333MHz DDR3 ECC
Graphics Info	1x ATI FireGL V3800 512MB PCIe Graphics
Disks/Optical/Floppy	2x SATA 500GB 7.2k rpm / 1 Optical / 0 Floppy
PSU	240W 90% Rev 0A
OS /BIOS	Win7 32 / v0.57

Energy Consumption

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	33.9 W		34.8 W		34.3 W	
Windows Busy Typ(S0)	85.1 W		83.4 W		85.2 W	
Windows Busy Max (S0)	105.1 W		100.4 W		106.6 W	
Sleep (S3)	2.21 W	1.83 W	2.39 W	2.00 W	2.20 W	1.81W
Off (S5)	1.22 W	1.06 W	1.37 W	1.21 W	1.20 W	1.05 W
Zero Power Mode (EuP)	0.17 W		0.27 W		0.16W	

Heat Dissipation**

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	115.7 btu/hr		118.7 btu/hr		117.0 btu/hr	
Windows Busy Typ(S0)	290.4 btu/hr		284.6 btu/hr		290.7 btu/hr	
Windows Busy Max (S0)	358.6 btu/hr		342.6 btu/hr		363.7 btu/hr	
Sleep (S3)	7.54 btu/hr	6.24 btu/hr	8.15 btu/hr	6.82 btu/hr	7.51 btu/hr	6.18 btu/hr
Off (S5)	4.16 btu/hr	3.62 btu/hr	4.67 btu/hr	4.13 btu/hr	4.09 btu/hr	3.58 btu/hr
Zero Power Mode (EuP)	0.58 btu/hr		0.92 btu/hr		0.55 btu/hr	

System Technical Specifications

Example Configuration #2

Processor Info	1x Intel Xeon E3-1280 3.5 8MB 4C 95W GT0 CPU
Memory Info	1x 2GB 1333MHz DDR3 ECC
Graphics Info	1x NVIDIA Quadro 600 1GB PCIe Graphics
Disks/Optical/Floppy	2x SATA 1000GB 7.2k rpm / 1 Optical / 0 Floppy
PSU	240W 90% Rev 0A
OS /BIOS	Win7 32 / v0.57

Energy Consumption

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	27.3 W		28.1 W		27.4 W	
Windows Busy Typ(S0)	153.7 W		150.8 W		154.2 W	
Windows Busy Max (S0)	172.5 W		170.3 W		176.2 W	
Sleep (S3)	2.32 W	2.26W	2.50 W	2.45 W	2.31 W	2.25W
Off (S5)	1.22 W	1.06 W	1.37 W	1.21 W	1.20 W	1.05 W
0.17 W	0.17 W		0.27 W		0.16W	

Heat Dissipation**

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	93.1 btu/hr		95.9 btu/hr		93.5 btu/hr	
Windows Busy Typ(S0)	524.4 btu/hr		514.5 btu/hr		526.1 btu/hr	
Windows Busy Max (S0)	58836 btu/hr		581.1 btu/hr		601.2 btu/hr	
Sleep (S3)	7.92 btu/hr	7.71 btu/hr	8.53 btu/hr	8.36 btu/hr	7.88 btu/hr	7.68 btu/hr
Off (S5)	4.16 btu/hr	3.62 btu/hr	4.67 btu/hr	4.13 btu/hr	4.09 btu/hr	3.58 btu/hr
Zero Power Mode (EuP)	0.58 btu/hr		0.92 btu/hr		0.55 btu/hr	

Example Configuration #3

Processor Info	1x Intel Xeon E3-1280 3.5 8MB 4C 95W GT0 CPU
Memory Info	4x 4GB 1333MHz DDR3 ECC
Graphics Info	1x NVIDIA Quadro 600 1GB PCIe Graphics
Disks/Optical/Floppy	2x SATA 1000GB 7.2k rpm / 1 Optical / 0 Floppy
PSU	240W 90% Rev 0A
OS /BIOS	Win7 64 / v0.57

Energy Consumption

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	34.7 W		35.3 W		35.1 W	
Windows Busy Typ(S0)	173.7 W		175.6 W		173.5 W	
Windows Busy Max (S0)	196.8 W		190.2 W		198.5 W	
Sleep (S3)	2.79W	2.42 W	2.98 W	2.62 W	2.77 W	2.41 W
Off (S5)	1.22 W	1.06 W	1.37 W	1.21 W	1.20 W	1.05 W
Zero Power Mode (EuP)	0.17 W		0.27 W		0.16W	

Heat Dissipation**

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	118.4 btu/hr		120.4 btu/hr		119.8 btu/hr	
Windows Busy Typ(S0)	592.7 btu/hr		599.1 btu/hr		592.0 btu/hr	
Windows Busy Max (S0)	671.48 btu/hr		649.0 btu/hr		677.3 btu/hr	
Sleep (S3)	9.52 btu/hr	8.26 btu/hr	10.17 btu/hr	8.94 btu/hr	9.45 btu/hr	8.22 btu/hr
Off (S5)	4.16 btu/hr	3.62 btu/hr	4.67 btu/hr	4.13 btu/hr	4.09 btu/hr	3.58 btu/hr
Zero Power Mode (EuP)	0.58 btu/hr		0.92 btu/hr		0.55 btu/hr	

System Technical Specifications

Example Configuration #4 (ENERGY STAR Qualified)	Processor Info	1x Intel Core i3-2120 3.3 3MB 2C 65W GT1 CPU
	Memory Info	4x 4GB 1333MHz DDR3 nECC
	Graphics Info	Integrated Graphics
	Disks/Optical/Floppy	2x SATA 1000GB 7.2k rpm / 1 Optical / 0 Floppy
	PSU	240W 90% Rev 0A
	OS /BIOS	Win7 64 / v0.57

Energy Consumption

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
On-Idle (ENERGY STAR® Idle (S0))	29.6 W		30.6 W		29.8 W	
ENERGY STAR® P_{MAX} Windows running Linpack and Viewperf	212.17 W		208.04W		210.42 W	
ENERGY STAR® "Sleep" (S3)	2.74W	2.35 W	2.93 W	2.53 W	2.74 W	2.35 W
ENERGY STAR® "Standby" (Off) (S5)	1.22 W	1.06 W	1.37 W	1.21 W	1.20 W	1.05 W

Heat Dissipation**

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
On-Idle (ENERGY STAR® Idle (S0))	101.0 btu/hr		104.4 btu/hr		101.7 btu/hr	
ENERGY STAR® P_{MAX} Windows running Linpack and Viewperf	723.9 btu/hr		709.8 btu/hr		718.0 btu/hr	
ENERGY STAR® "Sleep" (S3)	9.35 btu/hr	8.02 btu/hr	10.00 btu/hr	8.63 btu/hr	9.35 btu/hr	8.02 btu/hr
ENERGY STAR® "Standby" (Off) (S5)	4.16 btu/hr	3.62 btu/hr	4.67 btu/hr	4.13 btu/hr	4.09 btu/hr	3.58 btu/hr

NOTES:

** Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (Entry-level and High-end configurations)		
System Configuration (Entry level)	Processor Info	Intel Xeon E3-1270 3.4 GHz
	Memory Info	2 x 2GB DDR3 1333 MHz
	Graphics Info	NVIDIA Quadro NVS 300
	Disks/Optical/Floppy	1 x 250 GB 7200 RPM SATA/ DVD-ROM

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)	Desktop operator Sound Pressure (LpAm, decibels)
	Idle	3.3 Bels	22 dB
	Hard drive Operating (random reads)	3.4 Bels	24 dB
	DVD-ROM Operating (sequential reads)	5.0 Bels	40 dB

System Technical Specifications

System Configuration (High-end)	Processor Info	Intel Xeon E3-1280 3.5 GHz
	Memory Info	4 x 4GB DDR3 1333 MHz
	Graphics Info	NVIDIA Quadro 600
	Disks/Optical/Floppy	2 x 300GB 10K rpm SATA/ DVD-ROM

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)	Desktop operator Sound Pressure (LpAm, decibels)
	Idle	3.6 Bels	27 dB
	Hard drive Operating (random reads)	4.0 Bels	30 dB
	DVD-ROM Operating (sequential reads)	5.0 Bels	40 db

Environmental Requirements	Temperature	Operating: 40° to 95° F (5° to 35° C) Non-operating: -40° to 140° F (-40° to 60° C)
	Humidity	Operating: 8% to 85% RH, non-condensing Non-operating: 8% to 90% RH, non-condensing
	Maximum Altitude	Operating: 10,000 feet (3,000 m) Non-operating: 30,000 feet (9,100 m)
	Dynamic (new)	Shock Operating: ½-sine: 40g, 2-3ms Non-operating: ½-sine: 160 cm/s, 2-3ms (~100g) square: 422 cm/s, 20g Vibration Operating random: 0.5g (rms), 5-300 Hz Non-operating random: 2.0g (rms), 10-500 Hz NOTE: Values represent individual shock events and do not indicate repetitive shock events.Values do not indicate continuous vibration.
	Cooling	Above 5,000 ft (1524 m) altitude, maximum operating temperature is de-rated by 1.8° F (1° C) per 1,000 ft (305 m) elevation increase

Physical Security and Serviceability	
Access Panel	Tool-less Includes system board and memory information
Expansion Cards	Tool-less
Processor Socket	Tool-less, except for the processor heatsink.
Green User Touch Points	Yes, on tool-free internal chassis mechanisms
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Screw-In

System Technical Specifications

Dual Color Power and HD LED on Front of Computer	Yes
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes
Restore CD/DVD Set	Restores the computer to its original factory shipping operating system. Orderable with the workstation, or available from Support.
Dual Function Front Power Switch	Yes, causes a fail-safe power off when held for 4 seconds
Padlock Support	Yes (optional): Locks side cover and secures chassis from theft 0.22-in diameter padlock loop at rear of system
Cable Lock Support	Yes, Kensington Cable Lock (optional): Locks side cover and secures chassis from theft 3 mm x 7 mm slot at rear of system
Universal Chassis Clamp Lock Support	Yes (optional): Locks side cover and locks cables to chassis. Secures chassis from theft and allows multiple units to be chained together when used with optional cable Threaded feature at rear of system
Solenoid Lock and Hood Sensor	Yes (optional) The Solenoid Hood Lock eliminates the need for a physical key by making the chassis lockable through software and a password. You can also lock and unlock the chassis remotely over the network. The Sensor Kit detects when the access panel has been removed.
Rear Port Control Cover	Yes, locks rear IO cables to prevent cable theft
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Yes, enables or disables serial, USB, audio, and network ports
Removable Media Write/Boot Control	Yes, prevents ability to boot from removable media on supported devices (and can disable writes to media)
Power-On Password	Yes, prevents an unauthorized person from booting up the workstation
Setup Password	Yes, prevents an unauthorized person from changing the workstation configuration
3.3V Aux Power LED on System PCA	Yes
NIC LEDs (integrated) (Green & Amber)	Yes
CPUs and Heatsinks	A T-15 Torx or flat blade screwdriver is needed to remove the CPU heatsink before the CPU can be removed. CPU removal is tool-less
Power supply diagnostic LED	No
Power Button	Yes, ACPI multi-function
Power LED	Yes, blue (normal), red (fault)
Hard drive activity LED	Yes, green
Internal speaker	Yes
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS.
Cooling Solutions	Air cooled forced convection

Power Supply Fans	92 mm x 92 mm x 25 mm 4-wire PWM (non-serviceable)
CPU Heatsink Fan(s)	Not applicable- CPU heatsink is passive.
Chassis Fans	92 mm x 92mm x 25 mm 4-wire PWM
Memory Fans	No
HP Vision Diagnostics Offline Edition	HP Vision Diagnostics utility must be booted from USB or CD, and enables you to perform testing and to view critical computer hardware and software configuration information from various sources.
Access Panel Key Lock	No
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). • Allows the system to wake from a low power mode. • Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system
Trusted Platform Module Chip with optional ProtectTools Software	Yes
Integrated Chassis Handles	No
Power Supply	Tool-less
PCI Card Retention	Yes, rear (all), middle (none), front (none)
Flash ROM	Yes
Diagnostic Power Switch LED on board	Yes
Clear Password Jumper	Yes
Clear CMOS Button	Yes
CMOS Battery Holder for easy Replacement	Yes
DIMM Connectors for easy Upgrade	Yes
HP ProtectTools Security Manager	Yes - Not supported on Microsoft XP x64 or Linux

BIOS	
BIOS 32-bit Services	Standard BIOS 32-bit Service Directory Proposal v0.4
PCI 3.0 Support	Full BIOS support for PCI Express through industry standard interfaces.
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0.
BBS	BIOS Boot Specification v1.01.
WMI Support	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications.
BIOS Boot Spec 1.01+	Provides more control over how and from what devices the workstation will boot.
BIOS Power On	Users can define a specific date and time for the system to power on.
ROM Based Computer Setup Utility (F10)	Review and customize system configuration settings controlled by the BIOS.

System Technical Specifications

System/Emergency ROM Flash Recovery with Video	Recovers system BIOS in corrupted Flash ROM.
Replicated Setup	Saves BIOS settings to USB flash device in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Setup).
SMBIOS	System Management BIOS 2.7.1, for system management information.
Boot Control	Disables the ability to boot from removable media on supported devices.
Memory Change Alert	Alerts management console if memory is removed or changed.
Thermal Alert	Monitors the temperature state within the chassis. Three modes: • NORMAL - normal temperature ranges. • ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown. • SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs.
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console.
ACPI (Advanced Configuration and Power Management Interface)	Allows the system to enter and resume from low power modes (sleep states). Enables an operating system to control system power consumption based on the dynamic workload. Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
Remote Wakeup/Remote Shutdown	System administrators can power on, restart, and power off a client computer from a remote location.
ASF 2.0 Compliant	No.
Instantly Available PC (Suspend to RAM - ACPI sleep state S3)	Allows for very low power consumption with quick resume time.
Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating system.
ROM revision levels	Reports the system BIOS revision level in Computer Configuration Utility (F10 Setup). Version is available through an industry standard interface (SMBIOS) so that management SW applications can use and report this information.
System board revision level	Allows management SW to read revision level of the system board. Revision level is digitally encoded into the HW and cannot be modified.
Start-up Diagnostics (Power-on Self-Test)	Assesses system health at boot time with selectable levels of testing.
Auto Setup when new hardware installed	System automatically detects addition of new hardware.
Keyboard-less Operation	The system can be booted without a keyboard.
Localized ROM Setup	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 12 languages with local keyboard mappings.
Asset Tag	The user or MIS to set a unique tag string in non-volatile memory.
Per-slot Control	Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually.
Adaptive Cooling	Control parameters are set according to detected hardware configuration for optimal acoustics.
Pre-boot Diagnostics	(Pre-video) critical errors are reported via beeps and blinks on the power LED.

Intel® Active Management Technology (AMT)	AMT 7.0; Allows workstation status to be monitored on a remote console
Industry Standard Specification Support	
Industry Standard	Revision Supported by the BIOS
ACPI	Advanced Configuration and Power Management Interface, Version 1.0
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
CD Boot	"El Torito" Bootable CD-ROM Format Specification Version 1.0
EDD	- Enhanced Disk Drive Specification Version 1.1 - BIOS Enhanced Disk Drive Specification Version 3.0
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
PCI	PCI Local Bus Specification, Revision 2.3 PCI Power Management Specification, Revision 1.1 PCI Firmware Specification, Revision 3.0, Draft .7
PCI Express	PCI Express Base Specification, Revision 2.0
PMM	POST Memory Manager Specification, Version 1.01
SATA	- Serial ATA Specification, Revision 1.0a - Serial ATA II: Extensions to Serial ATA 1.0, Revision 1.0a - Serial ATA II Cables and Connectors Volume 2 Gold
SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Computing Group TPM Specification Version 1.2
USB	Universal Serial Bus Revision 1.1 Specification
USB 2.0	Universal Serial Bus Revision 2.0 Specification
SMBIOS	UEFI 2.1

Social and Environmental Responsibility	
Eco-Label Certifications & Declarations	This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks: • ENERGY STAR® (energy-saving features available on selected configurations -Windows only) • US Federal Energy Management Program (FEMP) • China Energy Conservation Program • IT ECO declaration
Recycled Content and Design for Recycling	Hewlett-Packard offers end-of-life HP product Return and recycling programs in many geographical areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
Batteries	Batteries used in the product do not contain: • Mercury greater than 5ppm by weight • Cadmium greater than 10ppm by weight • Lead greater than 40 ppm by weight.

Restricted Material Usage	This product meets the material restrictions specified in HP's General Specification for the the Environment: http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. This product is brominated flame retardant and polyvinyl chloride free (BFR/PVC-free); meeting the evolving definition of "BFR/PVC-free" as set forth in the "iNEMI Position Statement on the 'Definition of Low-Halogen Electronics (BFR/CFR/PVC-Free).'" Plastic parts contain <1,000 ppm (0.1 percent) of bromine (if the Br source is from BFRs) and <1,000 ppm (0.1 percent) of chlorine (if the Cl source is from CFRs or PVC or PVC copolymers). All printed circuit board (PCB) and substrate laminates contain bromine/chlorine total <1,500 ppm (0.15 percent) with a maximum chlorine of 900 ppm (0.09 percent) and maximum bromine being 900 ppm (0.09 percent). Service parts after purchase may not be BFR/PVC-free. Exceptions to this claim that may be shipped with the product include the power cord, keyboard, mouse and video adapters which may not be BFR/PVC-free.
Packaging	This product meets the packaging requirements specified in HP's General Specification for the Environment. http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf • Design packaging materials for ease of disassembly. • Maximize the use of post-consumer recycled content materials in packaging materials. • Use readily recyclable packaging materials such as paper and corrugated materials. • Reduce size and weight of packages to improve transportation fuel efficiency.
Packaging Materials	
External	Corrugated Carton. The Corrugated Carton packaging material is made from 100% recycled content.
Internal	EPE - Expanded Polyethylene, Polyethylene low density foam. The EPE - Expanded Polyethylene packaging material is made from 100% recycled content The Polyethylene low density foam packaging material is made from 100% recycled content
End-of-Life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. This product is greater than 90% recyclable by weight when properly disposed of at end of life. This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html
Service, Support and Warranty	On-site Warranty and Service (Note 1): One and three-years, limited warranty and service offering delivers on-site, next business-day (Note 2) service for parts and labor and includes free telephone support (Note 3) 8am - 5pm. Global coverage (Note 2) ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country. NOTE 3: Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party

	hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries. HP Care Pack Services extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/lookuptool. Additional HP Care Pack Services information by product is available at: http://www.hp.com/hps/carepack. Service levels and response times for HP Care Packs may vary depending on your geographic location. This product is designed to be upgraded, possibly extending its useful life by several years. Spare parts are available throughout the warranty period and for up to 5 years after the end of production.
Additional Information	• This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC. • This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC. • Plastic parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043. • This product contains 0% recycled materials (by weight) • This product is >90% recycle-able when properly disposed of at end of life. For more details on the following please refer to the respective sections: • Energy Consumption and Power Supply Efficiency • Heat Dissipation • Declared Noise Emissions

Manageability	
HP Client Management Solutions	Visit: http://www.hp.com/go/easydeploy
Product Change Notification	• Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by email to customers, based on a user-defined profile. • PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition. • Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support.
Support Software CD & WWW	Yes
HP Client Manager	Visit: http://www.hp.com/go/easydeploy
System Software Manager	Visit: http://www.hp.com/go/ssm
Intel® vPro™ Technology	The HP Z210 workstations support Intel vPro technology when purchased with a vPro technology capable CPU: Intel® Xeon® processor E3-1200 family or 2nd Generation Intel Core i5/i7 processors with Intel VT and Intel TXT technology
Intel Advanced Management Technology (AMT) v7.0	An advanced set of remote management features and functionality which provides network administrators the latest and most effective tools to remotely discover, heal, and protect networked client systems regardless of the system's health or power state. AMT 7.0 includes the following advanced management functions: • Power Management (on, off, reset) • Hardware Inventory (includes BIOS and firmware revisions • Hardware Alerting • Agent Presence

	• System Defense Filters • SOL/IDER • Cisco NAC/SDN Support • ME Wake-on-LAN • DASH 1.1 compliance • IPv6 Support • Fast Call for Help - a client inside or outside the firewall may initiate a call for help via BIOS screen, periodic connections, or alert triggered connection • Remote Scheduled Maintenance - pre-schedule when the PC connects to the IT or service provider console for maintenance. Remote PCs can get required patches, be inventoried, etc by connecting to their IT console or Service Provider when it's convenient • Remote Alerts - automatically alert IT or service provider if issues arise • Access Monitor - Provides oversight into Intel® AMT actions to support security requirements • PC Alarm Clock • Microsoft NAP Support • Host Base set-up and configuration • Management Engine (ME) firmware roll back • Wireless AMT functionality on Desktop (WoDT) • Enhanced KVM resolution

Stable & Consistent Offerings

As part of its commitment to hardware, software, and solution innovation, HP is proud to introduce this breakthrough platform configuration stability to HP Workstation customers. HP Stable & Consistent Offerings are built on the foundation of a carefully chosen set of hardware and software designed and tested to work with all HP Z Workstation platforms through their end of life. These components and their corresponding HP Workstation platform compatibility are outlined in this section. HP Stable & Consistent Offerings are available worldwide to all HP Workstation customers-no special programs, no additional cost-no kidding. Simply select your hardware and software components when you customize your HP Workstation and be assured that you'll be able to buy that same configuration throughout the lifecycle of the product.

Processors	Intel Xeon processor E3-1225, 3.10 GHz, 95W, 6 MB cache, 1333 MHz memory, Quad-Core, no HT, HD Graphics P3000, featuring Intel vPro Technology
	Intel Xeon processor E3-1230, 3.20 GHz, 80W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel vPro Technology
	Intel Xeon processor E3-1240, 3.30 GHz, 80W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel vPro Technology
	Intel Xeon processor E3-1245, 3.30 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, HD Graphics P3000, featuring Intel vPro Technology
	Intel Xeon processor E3-1270, 3.40 GHz, 80W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel vPro Technology
	Intel Xeon processor E3-1280, 3.50 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel vPro Technology
	Intel Core i3-2100 processor, 3.10 GHz, 65W, 3 MB cache, 1333 MHz memory, Dual-Core, HT, Intel HD Graphics 2000
	Intel Core i3-2120 processor, 3.30 GHz, 65W, 3 MB cache, 1333 MHz memory, Dual-Core, HT, Intel HD Graphics 2000
	Intel Core i5-2400 processor, 3.10 GHz, 95W, 6 MB cache, 1333 MHz memory, Quad-Core, no HT, Intel HD Graphics 2000, featuring Intel vPro Technology
	Intel Core i5-2500 processor, 3.30 GHz, 95W, 6 MB cache, 1333 MHz memory, Quad-Core, no HT, Intel HD Graphics 2000, featuring Intel vPro Technology
	Intel Core i7-2600 processor, 3.40 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Intel HD Graphics 2000, featuring Intel vPro Technology
	Intel Pentium processor G850, 2.9 GHz, 65W, 3MB cache, 1333 MHz memory, Dual-Core, Intel HD Graphics 2000
	Intel Pentium processor G620, 2.6 GHz, 65W, 3MB cache, 1066 MHz memory, Dual-Core, Intel HD Graphics 2000

Technical Specifications - Hard Drives

SATA (Serial ATA) Hard Drives for HP Workstations	600GB SATA 10K rpm SFF in 3.5" Frame HDD	Capacity	600GB	
		Height	1 in; 2.54 cm	
		Width	Media Diameter	2.5 in; 6.36 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (3.0Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 300MB/s	
		Buffer	32MB	
		Cache	Segmentable	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.4 ms (max)
			Average	3.6 ms
			Full Stroke	9.0 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	1,172,123,568	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	300GB SATA 10K rpm SFF in 3.5" Frame HDD	Capacity	300,069,052,416 bytes	
		Height	1 in; 2.54 cm	
		Width	Media Diameter	2.5 in; 6.36 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
		Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
		Cache	16 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.7 ms (maximum)
			Average	4.4 ms
			Full Stroke	9.5 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	586,072,368	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	160GB SATA 10K rpm SFF in 3.5" Frame HDD	Capacity	160,041,885,696 bytes	
		Height	1 in; 2.54 cm	
		Width	Media Diameter	2.5 in; 6.36 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (1.5 Gb/s), Native Command Queuing enabled	
		Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
		Buffer	16 MB	

	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7 ms (maximum)
		Average	4.4 ms
		Full Stroke	9.5 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	41° to 131° F (5° to 55° C)	
1TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	1 Terabyte (1000 GB)	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600 MB/s	
	Buffer	32MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	1,953,525,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
500GB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	500GB	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
	Buffer	16MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
250GB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	250 GB	
	Height	1 in; 2.54 cm	

		Width	Media Diameter	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (6.0Gb/s), NCQ enabled	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	2 ms
			Average	11 ms
			Full Stroke	21 ms
		Rotational Speed	7,200 rpm	
		Logical Blocks	488,397,168	
		Operating Temperature	41° to 131° F (5° to 55° C)	
HP Solid State Drives for Workstations	HP 160GB SATA X25-M SSD	Capacity	160,041,885,696 bytes	
		Height	0.28 in; 0.7 cm	
		Width	Media Diameter	NaN in; N/A cm
			Physical Size	2.5 in; 6.36 cm
		Interface	SATA	
		Synchronous Transfer Rate (Maximum)	3Gb/s	
		Seek Time (typical reads, includes controller overhead, including settling)	Average	Read: 75 microseconds; Write: 85 microseconds
		Logical Blocks	312,581,808	
		Operating Temperature	32° to 158° F (0° to 70° C)	

Technical Specifications - Graphics

Integrated Intel HD Graphics Media Accelerators (Z210)	Form Factor	Integrated
	Graphics Controller	Intel Integrated Graphics Media Accelerator HD
	Bus Type	PCI Express x16
	Memory	Unified Memory Architecture (UMA) frame buffer. Graphics memory is shared with system memory. Size selectable between 64 MB to 512 MB via BIOS setting. Default size is 64 MB. Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (Intel DVMT 5.0), to provide an optimal balance between graphics and system memory use.
	Connectors	Z210: 1 Single Link DVI-I, 1 DisplayPort Z210 SFF: 1 VGA, 1 DisplayPort Graphics adapters are orderable as an accessory as necessary.
	Maximum Resolution	DVI-I: 1920 x 1200 Display Port: 2560 x 1600
	RAMDAC	Integrated, 350 MHz
	Display Output	Z210: Integrated dual independent monitor support facilitated via one DVI port and one DisplayPort integrated on the back plane of the system board and presented as part of the rear I/O set of interfaces. Second DVI supported via optional DisplayPort to DVI-D adapter. VGA support via optional DVI to VGA adapter or DisplyPort to VGA adapter. Z210 SFF: Integrated dual independent monitor support facilitated via one VGA port and one DisplayPort integrated on the back plane of the system board and presented as part of the rear I/O set of interfaces. Second VGA supported via optional DisplayPort to VGA adapter. DVI support via optional DisplayPort to DVI adapter.
	Supported Graphics APIs	Intel HD Graphics 2000: Microsoft DirectX 10, OpenGL 2.1 Intel HD Graphics P3000: Microsoft DirectX 10.1, OpenGL 3.0

NVIDIA Quadro NVS 295 256MB Graphics Card	Form Factor	2.731 inches (H) × 6.600 inches (L), Half-Height
	Graphics Controller	NVIDIA Quadro NVS 295 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	256 MB GDDR3 SDRAM unified graphics memory
	Connectors	2 DisplayPort Comes with 2 DisplayPort to DVI-D Adapters ('DisplayPort to VGA' and 'DisplayPort to DL DVI' adapters available as an accessory)
	Maximum Resolution	Two DisplayPort outputs drive two digital displays up to 2560 x 1600 NOTE: This card supports up to two displays
	Display Output	• Drives DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking • Drives DVI enabled digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking (through DisplayPort to DVI-D (single link) cable)

Technical Specifications - Graphics

	Supported Graphics APIs	OpenGL 3.0 DirectX 10.0
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation (64-bit and 32-bit) SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
NVIDIA NVS 300 512MB Graphics Card	Form Factor	2.7 inches (H) x 5.7 inches (L), Half-Height
	Graphics Controller	NVIDIA NVS 300 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	512 MB GDDR3 SDRAM unified graphics memory
	Connectors	DMS-59 Includes DMS-59 to Dual DVI-I adapter DMS-59 to Dual DisplayPort adapter and DMS-59 to Dual VGA adapter available as an option DMS-59 to Dual DisplayPort adapter required for HP ZR30w Display
	Maximum Resolution	DVI: two digital displays up to 1920 x 1200 DisplayPort: two digital displays up to 2560 x 1600 VGA: two analog displays up to 1920 x 1080
	Image Quality Features	
	Display Output	This card support up to two displays: • Drives DVI enabled digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking • Drives DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking (through optional DMS-59 to DisplayPort adapter) • Drives VGA enabled analog displays at resolutions up to 1920 x 1080 (through optional DMS-59 to VGA adapter)
	Supported Graphics APIs	OGL 3.3 DirectX 10.1
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)

		HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
AMD FirePro 2270 512MB Graphics Card	Form Factor	Low Profile, Half Length, 2.3" x 6.6"
	Graphics Controller	AMD FirePro™ 2270 Professional Graphics
	Bus Type	PCI Express™ x16 Generation 2.0
	Memory	512MB DDR3
	Connectors	DMS-59 connector to support breakout cables for dual DisplayPort, DVI and VGA output. DMS-59 to Dual DVI adapter included. (Display Port and VGA adapters sold separately)
	Maximum Resolution	Digital 2560x1600 (DisplayPort) Analog 1920x1200 (DVI 60 Hz/ VGA 75Hz)
	RAMDAC	400 MHz DAC, 10-bit per channel
	Display Output	Card supports up to two displays
	Supported Graphics APIs	DirectX 11 and OpenGL 4.0
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	17W Maximum
ATI FirePro V3800 512MB Graphics Card	Form Factor	2.71 in (H) x 6.61 in (L) "Single-Wide"
	Graphics Controller	ATI FirePro V3800 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	512 MB DDR3 SDRAM
	Connectors	1 DL DVI, 1 DP output One DP to DVI adapter included
	Maximum Resolution	Up to two digital displays at resolutions up to 2560 x 1600 @ 60Hz or two analog displays, one at resolutions up to 2048 x 1536 @ 85Hz, the other at up to 1920 x 1200 @ 60Hz (165 MHz dot clock) NOTES: This card supports up to two displays Use of more than two displays on Linux requires support for xrandr 1.2 or greater in the X server
	RAMDAC	400 MHz DAC, 10-bits per channel
	Image Quality Features	• Full 30-bit display pipeline for more accurate color reproduction superior image quality (30-bit monitor required for full 30-bit display) • Advanced video capabilities, including high fidelity gamma, color correction and scaling • Dedicated hardware (UVD2) for H.264, VC-1, and MPEG2 decode

Technical Specifications - Graphics

	Shading architecture	• Support for Full Shader Model 5.0 • 400 Stream Processing Units • Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders • Common instruction set and texture unit access supported for all types of shaders • Dedicated branch execution units and texture address processors • Anti-aliases Shaders and Textures as well as Polygon Edges
	Supported graphics APIs	DirectX 11, OpenGL 3.2, OpenCL 1.0 and full implementation of DirectCompute 11 (OpenCL™ compliant driver and SDK release scheduled in 2010)
	Available graphics drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) WS4 * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	43 Watts
NVIDIA Quadro 400 512MB Graphics Card	Form Factor	Low Profile, 2.7 inches (H) x 5.6 inches (L)
	Graphics Controller	NVIDIA Quadro 400 Graphics Board
	Bus Type	PCI Express x 16, Generation 2.0
	Memory	512MB DDR3 SDRAM
	Connectors	One (1) Dual-link DVI-I One (1) DisplayPort 1.1 Includes one DisplayPort to Dual DVI-D adapter
	Maximum Resolution	DisplayPort 1.1: 2560 x 1600 @ 60 Hz Dual Link DVI-I: 2560 x 1600 @ 60 Hz Analog: 2048 x1536 @ 85 Hz
	RAMDAC	Dual internal 400 MHz DACs
	Display Output	This card supports up to two displays
	Supported Graphics APIs	OpenGL 3.2 DirectX 10.1 Shader Model 4.1
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

		Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	< 35 Watts
NVIDIA Quadro 600 1GB Graphics Card	Form Factor	2.731" H x 6.6" L Single Slot Small Form Factor
	Graphics Controller	NVIDIA Quadro 600 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	1 GB GDDR3 128-bit
	Connectors	1 DVI-I output, 1DisplayPort output One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories
	Maximum Resolution	DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 and Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	40 Watts

Integrated Intel/Realtek HD ALC261 Audio	Minimum System Requirements	Integrated

Technical Specifications - Optical and Removable Storage

HP DVD-ROM Drive	Description	5.25-inch, half-height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA/ATAPI	
	Dimensions (WxHxD)	(15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)	
	Disc Capacity	DVD-ROM	Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB
	Access Times	DVD-ROM Single Layer	< 140 ms (typical)
		CD-ROM Mode 1	< 125 ms (typical)
		Full Stroke DVD	< 250 ms (seek)
		Full Stroke CD	< 210 ms (seek)
	Power	Source	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p
		DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC - < 600 mA typical, < 1400 mA maximum
	Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90%
		Maximum Wet Bulb Temperature	86° F (30° C)
	Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation Novell SLED 10 & SLED 11 No driver is required for this device. Native support is provided by the operating system. * Certain Windows Vista product features require advanced or additional hardware. See http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. Windows Vista Business disk also included for future upgrade if desired. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements. ** RHEL WS4 not supported on Z200/Z200SFF	

HP DVD+/-RW Drive	Description	5.25-inch, half-height, tray-load
	Mounting Orientation	Either horizontal or vertical
	Interface Type	SATA/ATAPI
	Dimensions (WxHxD)	15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)

Technical Specifications - Optical and Removable Storage

Supported Media Types	DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
Disc Capacity	DVD-ROM	8.5 GB DL or 4.7 GB standard
Access Times	Full Stroke DVD	< 250 ms (seek)
	Full Stroke CD	< 210 ms (seek)
Maximum Data Transfer Rates	CD ROM Read	CD-ROM, CD-R Up to 40X CD-RW Up to 32X
	DVD ROM Read	DVD-RAM Up to 12X DVD+RW Up to 8X DVD-RW Up to 8X DVD+R DL Up to 8X DVD-R DL Up to 8X DVD-ROM Up to 16X DVD-ROM DL Up to 8X DVD+R Up to 16X DVD-R Up to 16X
Power	Source	SATA DC power receptacle
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p
	DC Current	5 VDC -<1000 mA typical, <1600 mA maximum 12 VDC -<600 mA typical, <1400 mA maximum
Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 90%
	Maximum Wet Bulb Temperature	86° F (30° C)
Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation Novell SLED 10 & SLED 11 No driver is required for this device. Native support is provided by the operating system. *Certain Windows Vista product features require advanced or additional hardware. See http://microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit:	

		http://www.windowsvista.com/upgradeadvisor. Windows Vista Business disk also included for future upgrade if desired. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements ** RHEL WS4 not supported on Z200/Z200SFF
	Kit Contents	HP SATA SuperMulti DVD Writer Drive, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide, and DVD+R media.

HP 22-in-1 Media Card Reader	Description	The Media Card Reader device uses the same physical form factor and mounting as a Floppy Disk Drive. The device connects to a 2x5 two-channel USB header on the motherboard of the system. There is no USB controller card provided. Please see the Disc Formats section below for a list of flash memory card formats that are supported.
	Mounting Orientation	The Media Card Reader can be mounted in a dedicated Floppy Drive bay (if the chassis provides one) or in an appropriate Optical Bay adapter. It will operate in any orientation.
	Interface Type	USB 2.0 (one channel dedicated to the separate USB port; one channel dedicated to the flash memory card slots)
	Dimensions (WxHxD)	124.5 x 101.6 x 25.4 mm (4.9 x 4.0 x 1.0 in)
	Supported Media Types	xD-Picture Micro SD Micro SDHC SD SDHC SDXC Mini SD Mini SDHC MultiMediaCard (MMC) Reduced Size MultiMediaCard (RS MMC) MultiMedia Card 4.2 (MMC Plus, including MMC Plus HC) Reduced Size MultiMedia Card 4.2 (MMC Mobile, including MMC Mobile HC) CompactFlash Card Type I CompactFlash Card Type II MicroDrive Memory Stick (MS) MagicGate Memory Stick (MG) MagicGate Memory Stick Duo Memory Stick Select Memory Stick Duo (MS Duo) Memory Stick PRO (MS PRO) Memory Stick PRO Duo (MS PRO Duo) Memory Stick PRO-HG Duo Two additional formats are usable with adapters (not supplied): MMC Micro Memory Stick Micro (M2)

Technical Specifications - Optical and Removable Storage

HP Blu-ray Writer	Description	5.25-inch, half-height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA	
	Dimensions (WxHxD)	15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)	
	Supported Media Types	BD-ROM BD-R BD-RE DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
	Disc Capacity	DVD-ROM	8.5 GB DL or 4.7 GB standard
		Blu-ray	50 GB DL or 25 GB standard
	Access Times	Full Stroke DVD	< 250 ms (seek)
		Full Stroke CD	< 210 ms (seek)
		Blu-ray	< 275 ms (seek)
		Startup Time	(Time to drive ready from tray loading) BD-ROM (SL/DL) 25S / 28S BD-R (SL/DL) 25S / 28S BD-RE (SL/DL) 25S / 28S DVD-ROM (SL/DL) 18S / 18S DVD-R (SL/DL) 25S / 25S DVD-RW 25S DVD+R (SL/DL) 25S / 25S DVD+RW 25S DVD-RAM 45S CD-ROM 15S
	Maximum Data Transfer Rates	CD ROM Read	CD-ROM Up to 40X CD-R Up to 40X CD-RW Up to 40X
		DVD ROM Read	DVD-RAM Up to 5X DVD+RW Up to 10X DVD-RW Up to 10X DVD+R DL Up to 8X DVD-R DL Up to 8X DVD-ROM Up to 16X DVD-ROM DL Up to 8X DVD+R Up to 12X DVD-R Up to 12X

Technical Specifications - Optical and Removable Storage

	Blu-ray	BD-ROM Up to 6X BD-ROM DL Up to 4.8X BD-R Up to 6X BD-R DL Up to 4.8X BD-R Up to 6X BD-RE SL/DL Up to 4.8X
Power	Source	SATA DC power receptacle
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 10%-100 mV ripple p-p
	DC Current	5 VDC -900 mA typical, 1200 mA maximum 12 VDC -1000 mA typical, 1600 mA maximum
Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	15% to 80%
	Maximum Wet Bulb Temperature	86° F (30° C)
Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation Novell SLED 10 & SLED 11 * No driver is required for this device. Native support is provided by the operating system. ** RHEL WS4 not supported on Z200/Z200SFF	
Kit Contents	HP Blue Laser RW Drive, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide.	
Disclaimer	As Blu-ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.	

Technical Specifications - Networking and Communications

Integrated Intel 82579LM PCIe GbE Controller	Connector	RJ-45
	Controller	Intel 82579LM GbE platform LAN connect networking controller
	Memory	24 KB FIFO packet buffer memory
	Data Rates Supported	10/100/1000 Mbps
	Compliance	802.1P, 802.1Q, 802.2, 802.3, 802.3ab, 802.3az, 802.3u
	Bus Architecture	PCI Express and SMBus
	Data Transfer Mode	PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic (Sx low power state)
	Power Requirement	Requires 3.3V and 1.05V or just 3.3V with integrated regulators
	Boot ROM Support	Yes
	Network Transfer Mode	Full-duplex; Half-duplex (not supported for the 1000BASE-T transceiver)
	Network Transfer Rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
	Management Capabilities	WOL, auto MDI crossover, PXE, Muti-port teaming, RSS, Advanced cable diagnostic. AMT 7.0 support

Intel Gigabit CT Desktop NIC	Connector	RJ-45
	Controller	Intel WG82574L Gigabit Ethernet Controller
	Memory	Integrated Dual 48K configurable transmit receive FIFO Buffers
	Data Rates Supported	10/100/1000 Mb/s
	Compliance	IEEE 802.1P, 802,1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus Architecture	PCI-E 1.0a
	Data Path Width	X1, 250 MB/s, Bi-directional interface
	Data Transfer Mode	Bus-master DMA
	Hardware Certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power Requirement	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T
	Boot ROM Support	Yes
	Network Transfer Rate	10BASE-T (half-duplex) 10 Mb/s 10BASE-T (full-duplex) 20 Mb/s 100BASE-TX (half-duplex) 100 Mb/s 100BASE-TX (full-duplex) 200 Mb/s 1000BASE-T (full-duplex) 2000 Mb/s
	Operating Temperature	32° to 131°F (0° to 55°C)
	Operating Humidity	85% at 131°F (55°C)
	Dimensions (H x W x D)	12.1 x 5.7 x 2.0 cm (4.75 x 2.25 x 0.8 in)

Technical Specifications - Networking and Communications

Operating System Driver Support	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64, Windows Vista Business 32, Windows XP Professional, Windows XP x64. Red Hat Enterprise Linux 4 (RHEL4.8 or newer)*, Red Hat Enterprise Linux 5 (RHEL5.3 or newer), Red Hat Enterprise Linux 6 * RHEL WS4 not supported on Z200/Z200SFF
Management Capabilities	WOL , PXE, DMI, WFM 2.0
Kit Contents	Intel Gigabit CT Desktop NIC, low profile bracket, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement